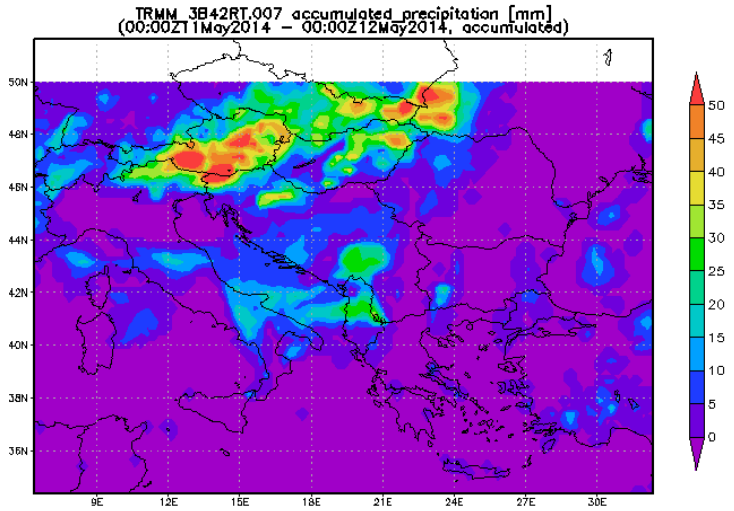
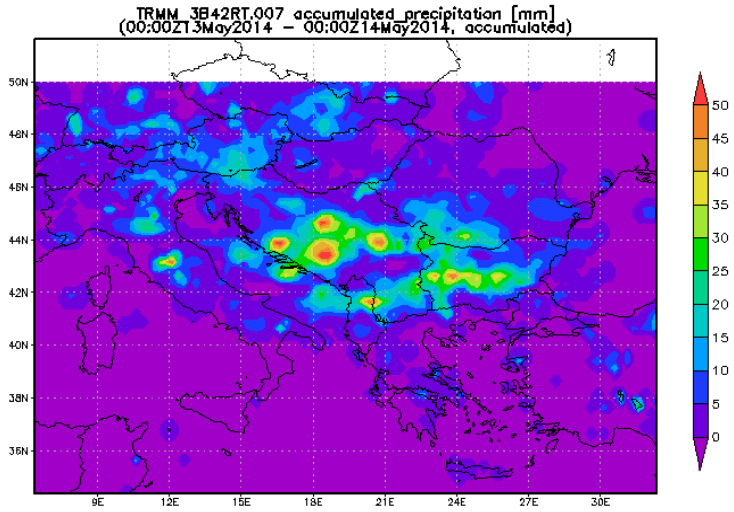
The Giovanni News
June 2014
GODDARD EARTH SCIENCES DATA & INFORMATION SERVICES CENTER (GES DISC)

Time-series of flooding rain in Bosnia-Herzegovina

First of all, it should be noted that the maps used in Giovanni-3 have become outdated by the march of history, and recently-established national boundaries may not be present. This is the case for Serbia, Bosnia-Herzegovina, and Croatia, which are not shown within the boundaries of the former Yugoslavia. Weather, however, does not respect new or old national boundaries, even though it may be influenced by physiographic boundaries like mountains and rivers and lakes. The maps used by Giovanni-4 are current with modern events!



A.



B.

The accumulated precipitation maps shown depict the daily progression of the storms that caused the catastrophic rain event in Bosnia-Herzegovina in mid-May. The storm complex was located north of the country on May 11, as seen in map A. On May 13, the system moved into Bosnia-Herzegovina, shown in Map B. The peak of the rainfall event occurred on May 14, which is displayed in Map C. The accompanying time-series shows how strongly the rainfall event intensified on May 14 and also shows that some rain continued to fall through May 15. *(continued on page 2)*

In this Issue

From the Editors

We are pleased to report to you that one of the most significant releases in Giovanni-4 development has just been made available to the public. This new release makes several important data services operational, some of which have been previewed in previous issues of *The Giovanni News*. The article, "Giovanni-4 Development: Stepping Forward," provides some commentary on the Giovanni 4.8 Release Notes.

The Research Highlight shows that, when you build a better mousetrap (or in this case a better data visualization and analysis system), people are bound to come up with ways to use it that you didn't expect. This paper is an excellent demonstration of that principle.

The first article is about the flooding rains that beset Bosnia-Herzegovina in mid-May. Floods and landslides generated by this rain event were described by some local commentators as more destructive than war.

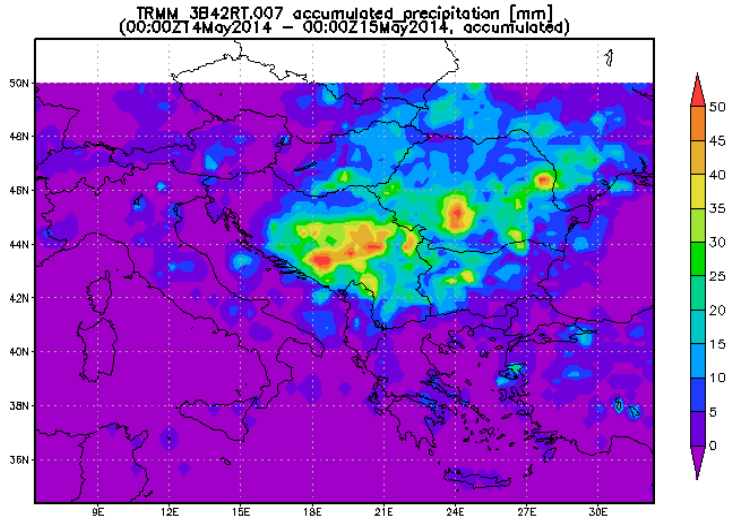
We hope that research using NASA data will provide insight into ways that can provide improved forecasts for such disasters, to better protect the populace and perhaps reduce the damage that raging nature can inflict.

Regards,
Jim Acker and Wainie Youn, Editors

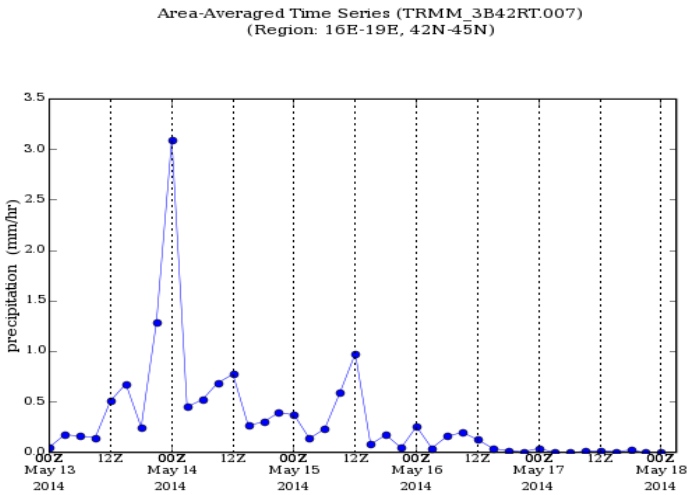
(continued from page 1)

Maximum rainfall amounts reported were approximately 300 mm, with a large area of the country receiving 100-200 mm (4-8 inches) of rain.

The resulting flooding from this event was reported to be the worst the region has experienced in over a century. The problems caused by the flooding were exacerbated by thousands of landslides in this mountainous country. One of the associated dangers was the displacement by flood waters of signs marking the locations of minefields left from the Balkan Wars. There were also fears that the flood waters might unearth and carry some of the unexploded mines downstream. More than one million people in Bosnia-Herzegovina were directly affected by this weather event.

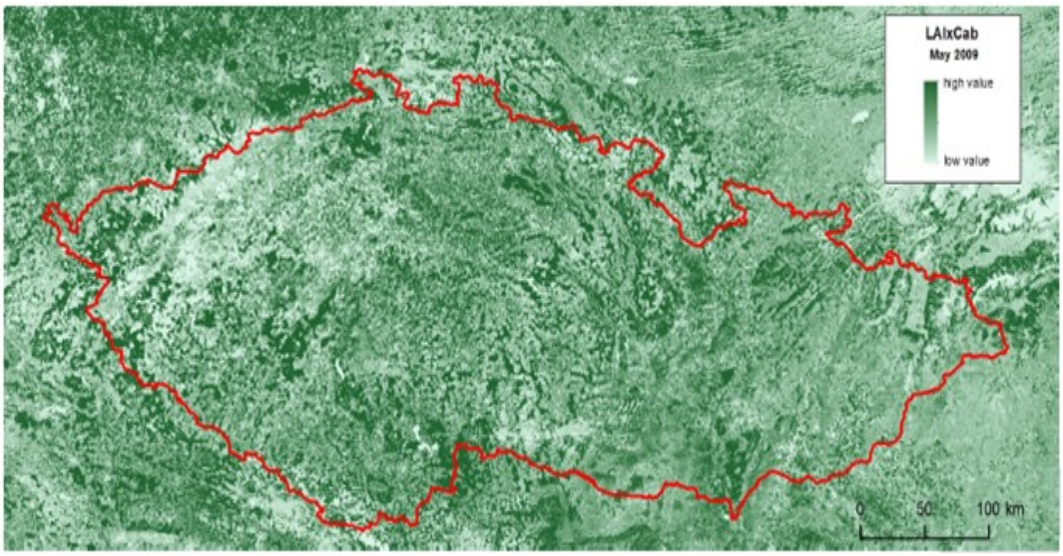


C.



Research Highlight: Multi-temporal analysis of vegetation reflectance using MERIS data in the Czech Republic

In this study, the researchers used visible band reflectance data from the European Space Agency's Medium Resolution Imaging Spectrometer (MERIS), which observed the Earth during the 2002-2012 Envisat mission. The goal of the study was to determine reflectance changes in the forests and agricultural areas of the Czech Republic during the growing season from April to September 2009.



From the paper: This image is the LAIxCab chlorophyll index for the Czech Republic (borders shown in red) in May 2009. Data for this image were atmospherically corrected using Aerosol Optical Depth data acquired from Giovanni.

The first step in the research was to obtain images of the Czech Republic with a low percentage of clouds. Fifteen acceptable full resolution (300 meter) Level 1 images were acquired. The images were then processed with the *Basic ERS and Envisat (A) ATSR and MERIS toolbox* (BEAM) software. To produce reflectance data and vegetation indices, it was necessary to perform atmospheric, radiometric, and geometric corrections. The atmospheric correction process required aerosol optical depth (AOD) data to determine the presence of aerosols and create an aerosol mask. Giovanni was used at this point to acquire the necessary AOD data for the atmospheric correction. After all the corrections were made, the LAIxCab index, which indicates the amount of chlorophyll in a plant, was calculated over the entire country. Forest masks and agricultural land masks were then created from existing data sources.

Following this procedure, monthly changes in reflectance were calculated for forest and agricultural areas. In the forested areas, as the growing season progressed, the reflectance generally increased, but with diverging reflectance for conifer and deciduous areas. Agricultural areas had low reflectance in April, except for areas growing oilseed rape and winter cereals. The largest increase in reflectance was observed for maize crops. The largest decrease was observed in midsummer in the cereal and oilseed rape fields, which had been harvested in midsummer. The reflectance of areas growing hops increased rapidly in the spring and declined rapidly in the late summer.

The authors stated that the results of their study clearly demonstrate the feasibility of using high resolution data to provide accurate maps of agricultural land. The results are useful for land cover classification and observation of the spectral characteristics of various types of vegetation.

Giovanni-4 Development: Stepping Forward

Giovanni-4 made a great step forward this month with an operational release featuring several new data analysis services (listed below). Following soon after will be the addition of important new data, including variables from the North American Land Data Assimilation System (NLDAS) model and the SeaWiFS Deep Blue Level 3 aerosol data, TRMM 3B43 precipitation, and AIRS+AMSU Level 3 Daily Cloud Fraction.

The following are six new data analysis services in the new release:

- ⇒ *Quasi-Climatology Map:* This service computes, for the entire time period of coverage, an average for a given month or three-month season, for each grid cell, and plots these averages on a map. This service is only available for monthly data.
- ⇒ *Seasonal Time Series:* This services computes an area-averaged time series of either a given month or 3-month meteorological season, over a user-selected time period of coverage. This service, which was previewed in an earlier issue of *The Giovanni News*, also operates solely on monthly data.
- ⇒ *Accumulation Map:* Applicable to such variables as rainfall (and perhaps eventually snowfall from the Global Precipitation Mission), this service computes accumulated values, instead of averaged values.
- ⇒ *Hovmöller Time Series:* This graphical service produces averages over latitude for the Longitude-Time Hovmöller or averages over longitude for the Latitude-Time Hovmöller. The April 2014 issue of *The Giovanni News* had a brief discussion of Hovmöller plots.
- ⇒ *Area Average Scatterplot:* This service allows a comparison of two variables by averaging over the selection box at each timestep and plotting these results on an X-Y scatterplot. *Area-Averaged Difference Time Series:* This service lets a user compare two variables by averaging each over the selection box and then plotting a time-series of the differences between the two variables.

Several other changes were made to improve the Giovanni-4 user experience:

- ⇒ New variable picker interface that groups similar plot choices together.
- ⇒ Refined seasonal date selection interface.
- ⇒ New variable naming scheme.
- ⇒ Greatly improved color bars!

The Giovanni News is a monthly publication of NASA's Goddard Earth Sciences Data and Information Services Center. The newsletter reports on events of interest, new Giovanni features, and other news relevant to the Earth science community and Giovanni users.

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Last year?
During the last decade?
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